

SPECIFICATION

HEAT SINK ASSEMBLY

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

[0001] The present invention relates generally to heat sink assemblies, and in particular to a heat sink assembly incorporating a fan which is releasably attached to a heat sink.

2. PRIOR ART

[0002] Developments in today's highly information-intensive society have led to remarkable improvements in performances of electronic devices. During operation of many contemporary electronic devices, large amounts of heat are produced. Such heat must be efficiently removed from the electronic device, to prevent the system from becoming unstable. Typically, a heat sink is attached to an outer surface of the device to facilitate removal of heat therefrom. A fan is often attached to the heat sink to provide forced air convection therefrom.

[0003] Fig.3 shows a conventional heat sink assembly, which includes a heat sink 70 and a fan 80. A plurality of fins 74 extends upwardly from a base 72 of the heat sink 70. The fan 80 is essentially a rectangular box, with a through hole defined in the vicinity of each corner thereof. In assembly, a tool such as a screwdriver (not shown) must be used to drive screws 76 through the corresponding through holes such that screws 76 engage with the fins 74 of the heat sink 70. Some fastening means (not shown, for example a clip, fastening screws etc) are received under the fan 80 for fixing the heat sink 70 to a top surface of a CPU. However, when a user needs to drive the fastening screws to attach the heat sink assembly to a computer or replace the clip, it is often required to detach the fan 80 from the heat sink 70. It is inconvenient to draw the screws for

detaching the fan 80 from the heat sink 70. Furthermore, there is an industry trend whereby the fins 74 are being made thinner and thinner. Thus the fins 74 are more frequently being distorted or even damaged when the screws 76 are engaged therewith.

SUMMARY OF THE INVENTION

[0004] Accordingly, an object of the present invention is to provide a heat sink assembly incorporating a mounting device which can releasably attach a fan to a heat sink.

[0005] To achieve the above-mentioned object, a heat sink assembly in accordance with a preferred embodiment of the present invention comprises a fan, a heat sink and a mounting device. The heat sink includes a base and plural of fins extending upwardly from the base. Plural of claws are formed in a top end of one fin which extends from a side of the base. A locking hole is defined in another fin which extends from an opposite side of the base. A vent is defined in a center of the mounting device, and four fixing holes are defined in four corners of the mounting device for engaging with four screws which extend through the fan to the mounting device. Plural of pivots are provided in a first side of the mounting device for pivotably received in the claw of the heat sink thereby pivotably attaching the mounting device to the heat sink. A hook is provided in an opposite side of the mounting device for engaging with the locking hole of the heat sink thereby releasably fixing the mounting device to the heat sink.

[0006] Other objects, advantages and novel features of the present invention will be drawn from the following detailed description of preferred embodiments of the present invention with attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Fig. 1 is an exploded, isometric view of a heat sink assembly in accordance with the preferred embodiment of the present invention;

[0008] Fig. 2 is an assembled view of Fig. 1; and

[0009] Fig. 3 is an assembled view of a conventional heat sink assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] Referring to Fig. 1, a heat sink assembly in accordance with the preferred embodiment of the present invention comprises a fan 10, a heat sink 20, and a mounting device 50.

[0011] The fan 10 is generally box-shaped, and has a through hole 12 defined at each of four corners thereof. Plural of screws 14 are for extending through the through holes 12 of the fan 10 to engage with the mounting device 50 respectively.

[0012] The heat sink 20 includes a base 22 and plural of fins 24 extending upwardly from the base 22. Three pairs of claws 26 are spaced formed in a top end of one fin 24 which extends upwardly from a side of the base 22. The claw 26 is in a “U” shape, and a pivot hole 27 is defined therein. An opening 29 and a locking hole 30 are defined in another fin 24 which extends from an opposite side of the base 22. Four fastening holes 34 are defined in the vicinity of four corners of the base 22. Four fastening screws 36 are for extending through the fastening holes 34 of the heat sink 20 respectively, for fastening the heat sink 20 to a motherboard (not shown). Wherein the fins 24 lies in a middle portion of the base 22 are higher than the fins 24 lies in two sides of the base 22, thus two grooves 32 are formed in a top of the heat sink 20. The grooves 32 can receive a clip (not shown) therein respectively, for fastening the heat sink 20 to the motherboard.

[0013] The mounting device 50 is rectangular shape. A vent 52 is defined in a

center of the mounting device 50, for providing airflow access for the fan 10. Four fixing holes 54 are defined in four corners of the mounting device 50, for engaging with the screws 14 which extend through the fan 10 to the mounting device 50 respectively. Plural of connection portions 55 and blocks 58 alternatively depend from a first side of the mounting device 50. A pivot 56 extends perpendicularly from a distal end of the connection portion 55, wherein the pivots 56 can be pivotably received in the pivot holes 27 of the heat sink 20 respectively thereby pivotably attaching the mounting device 50 to the heat sink 20. The blocks 58 can be fitted into the spaces between two pairs of claws 26, for preventing the pivots 56 sliding in the pivot holes 27. A handle 60 is provided in a second opposite side of the mounting device 50 opposing the first side. A hook 62 extends downwardly from a bottom of the handle 60, for engaging with the locking hole 30 of the heat sink 20 thereby fixing the mounting device 50 to the heat sink 20.

[0014] Referring to Fig. 2, in assembly, the fastening screws 36 are extended through the fastening holes 34 of the heat sink 20. The screws 14 are extended through the through holes 12 of the fan 10 to engage in the fixing holes 54 of the mounting device 50 respectively. The fan 10 is thus attached to the mounting devices 50. The pivots 56 of the mounting device 50 are then pivotably inserted into the pivot holes 27 of the heat sink 20. The hook 62 is releasably engaged in the locking hole 30 of the heat sink 20. Thus the combined fan 10 and mounting device 50 is attached to the heat sink 20.

[0015] In an alternative embodiment of the present invention, the hook 62 of the mounting device 50 and the locking hole 30 of the heat sink 20 can be replaced with a clasp(not shown) formed in a top end of the another fin 24 which extends from the opposite side of the base 22. The clasp can engage with the periphery of the mounting device 50, for fixing the mounting device 50 to the heat sink 20.

[0016] In the present invention, it is ready for a user to operate on the handle 60

to unlock the hook 62 from the locking hole 30, and rotate the mounting device 50 about the pivots 56 to thereby allow the user to change the clip (not shown) received in the groove 32 or drive the fastening screws 36 for fastening the heat sink 20 to the motherboard. It is also very convenient to re-fixing the mounting device 50 to the heat sink 20. Furthermore, the screws which are used to fasten the fan to the heat sink in the prior art are not required. Accordingly, the fins of the heat sink are not distorted as in the prior art.

[0017] It is understood that the invention may be embodied in other forms without departing from the spirit thereof. Thus, the present example and embodiments are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.